RAID on GnuLinux - Mdadm Reference

1 Overview

There are a few options for software RAID on Gnu Linux. Among them is BtrFS and ZFS, however today I will focus on using mdadm. This is historically the oldest software raid, therefore should be better vetted, although its performance may be less of that of the first two mentioned - for simple servers, mdadm might be the most stable choice.

2 Details

I've worked with this in setting up some Core 2 Duo PCs, with 2 to 4 Sata HDDs. This will be a reference. Let's begin.

2.1 Creation of RAID:

Will not be covered here (yet). You must create the partition tables. Create the raid with mdadm. mkfs.ext4 on the raid partition. Add mdadm to grub config. Reinstall grub. Details may be provided later.

2.2 Details of RAID:

```
root@advacoONE:/dev# sudo mdadm -D /dev/md127
/dev/md127:
        Version : 1.2
  Creation Time : Fri Feb  1 01:00:25 2019
     Raid Level : raid1
     Array Size : 57638912 (54.97 GiB 59.02 GB)
  Used Dev Size : 57638912 (54.97 GiB 59.02 GB)
   Raid Devices : 3
  Total Devices : 2
    Persistence : Superblock is persistent
```

```
    Update Time : Fri Feb  1 02:40:44 2019
          State : clean, degraded
 Active Devices : 2
Working Devices : 2
 Failed Devices : 0
  Spare Devices : 0

           Name : devuan:root
           UUID : 83a8dc03:802a4129:26322116:c2cfe1d4
         Events : 82

    Number   Major   Minor   RaidDevice State
       -       0        0        0      removed
       1       8       17        1      active sync   /dev/sdb1
       2       8       33        2      active sync   /dev/sdc1
root@advacoONE:/dev#--
```

so you can see, one was removed (it auto removes, when unplugged)

2.3 Add Drive to RAID:

sudo mdadm –add /dev/md127 /dev/sda1

NOTE2: If you setup 2 hdds, in a raid, and want to add a third, if you just –add, it will show up as a spare... if you do mdadm –grow /dev/md127 -raid-devices=3 then the third might be active sync (what we want) note that the –grow, seems to allow for parameter changes after you have already created the raid. you can also specify the exact same command, raid-devices=3 in the setup of the raid (see install doc). Note that if you lose a drive, you can simply add it.

NOTE: don't worry about mkfs.ext4 on the raid members, after initial setup. The RAID will manage that.

NOTE: if you have a new drive and need to copy the hdd partition tables: https://unix.stackexchange.com/questions/12986/how-to-copy-the-partition-layout-of-a-whole-disk-using-standard-tools or aka

```
(FOR MBR ONLY)
Save:
sfdisk -d /dev/sda > part_table

Restore:
sfdisk /dev/NEWHDD < part_table

(FOR GPT:)
# Save MBR disks
sgdisk --backup=/partitions-backup-$(basename $source).sgdisk $sou
sgdisk --backup=/partitions-backup-$(basename $dest).sgdisk $dest

# Copy $source layout to $dest and regenerate GUIDs
sgdisk --replicate=$dest $source
sgdisk -G $dest

root@advacoONE:/dev# mdadm --add /dev/md127 /dev/sda1
mdadm: added /dev/sda1
root@advacoONE:/dev# sudo mdadm -D /dev/md127
/dev/md127:
        Version : 1.2
  Creation Time : Fri Feb  1 01:00:25 2019
     Raid Level : raid1
     Array Size : 57638912 (54.97 GiB 59.02 GB)
  Used Dev Size : 57638912 (54.97 GiB 59.02 GB)
   Raid Devices : 3
  Total Devices : 3
    Persistence : Superblock is persistent

    Update Time : Fri Feb  1 02:41:43 2019
```

```
          State : clean, degraded, recovering
 Active Devices : 2
Working Devices : 3
 Failed Devices : 0
  Spare Devices : 1

 Rebuild Status : 0% complete

           Name : devuan:root
           UUID : 83a8dc03:802a4129:26322116:c2cfe1d4
         Events : 92

    Number   Major   Minor   RaidDevice State
       3       8        1        0      spare rebuilding   /dev/sd
       1       8       17        1      active sync   /dev/sdb1
       2       8       33        2      active sync   /dev/sdc1
root@advacoONE:/dev#
```

Looks good.

```
 Rebuild Status : 6% complete

           Name : devuan:root
           UUID : 83a8dc03:802a4129:26322116:c2cfe1d4
         Events : 103

    Number   Major   Minor   RaidDevice State
       3       8        1        0      spare rebuilding   /dev/sd
       1       8       17        1      active sync   /dev/sdb1
       2       8       33        2      active sync   /dev/sdc1
```

as it progresses, you see the RAID rebuilding.

```
watch -n1 cat /proc/mdstat

Every 1.0s: cat /proc/mdstat
advacoONE: Fri Feb  1 02:43:24 2019
```

```
Personalities : [raid1] [linear] [multipath] [raid0] [raid6] [raid
md127 : active raid1 sda1[3] sdb1[1] sdc1[2]
      57638912 blocks super 1.2 [3/2] [_UU]
      [==>..................]  recovery = 11.2% (6471936/57638912)

unused devices: <none>
```

WARNING: Reinstall grub on the new drive again as well afterwards.

2.4 Email Notifications on mdadm

Test emails on mdadm.. first configure email however you prefer (i currently use ssmtp, see this link: https://wiki.zoneminder.com/How_to_get_ss
–

then edit /etc/mdadm/mdadm.conf to have your email in mailaddr then

```
sudo mdadm --monitor --scan --test --oneshot
```

should send an email

https://ubuntuforums.org/showthread.php?t=1185134 for more details on email sending

3 References


```
The section about degraded disks
https://help.ubuntu.com/lts/serverguide/advanced-installation.html

General partition tips.
https://github.com/zfsonlinux/zfs/wiki/Debian-Stretch-Root-on-ZFS

SSMTP email setup:
https://wiki.zoneminder.com/How_to_get_ssmtp_working_with_Zonemind
 wiki.zoneminder.com/SMS_Notifications
```